

## SEQUENCE LISTING

- (1) GENERAL INFORMATION:
- 5 (i) APPLICANT: Robert G. Ulrich,  
Mark A. Olson  
Sina Bavari
- 10 (ii) TITLE OF INVENTION: Bacterial Superantigen  
Vaccines
- (iii) NUMBER OF SEQUENCES:16
- 15 (iv) CORRESPONDENCE ADDRESS:  
(A) ADDRESSEE: John Moran  
(B) STREET: US Army MPMC -504 Scott Street  
MCMR-JA (John Moran-Patent Atty)  
(C) CITY: FORT DETRICK  
(D) STATE: MARYLAND  
20 (E) COUNTRY: USA  
(F) ZIP: 21702-5012
- (v) COMPUTER READABLE FORM:
- 25 (A) MEDIUM TYPE: Floppy disk  
(B) COMPUTER: Apple Macintosh  
(C) OPERATING SYSTEM: Macintosh 7.5  
(D) SOFTWARE: Microsoft Word 6.0
- 30 (vi) CURRENT APPLICATION DATA:  
(A) APPLICATION NUMBER:  
(B) FILING DATE:  
(C) CLASSIFICATION:
- 35 (vii) PRIOR APPLICATION DATA:  
(A) APPLICATION NUMBER:  
(B) FILING DATE:
- 40 (viii) ATTORNEY/AGENT INFORMATION:  
(A) NAME: Moran, John  
(B) REGISTRATION NUMBER: 26,313  
(C) REFERENCE/DOCKET NUMBER:
- 45 (ix) TELECOMMUNICATION INFORMATION  
(A) TELEPHONE: (301) 619-2065  
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## SEQ ID NO:1:

50 Staphylococcal enterotoxin A vaccine A489270P, periplasmic  
Gene sequence:

1 ATGAAAAAAAA CAGCATTTAC ATTACTTTTA TTCATTGCC TAACGTTGAC  
AACAAGTCCA

5 61 CTTGTAAATG GTAGCGAGAA AAGCGAAGAA ATAAATGAAA AAGATTTGCG  
AAAAAAGTCT

121 GAATTGCAGG GAACAGCTTT AGGCAATCTT AAACAAATCT ATTATTACAA  
TGAAAAAGCT

10 181 AAAACTGAAA ATAAAGAGAG TCACGATCAA TTTCGACAGC ATACTATATT  
GTTTAAAGGC

241 TTTTITACAG ATCATTCGTG GTATAACGAT TTATTAGTAC GTTTTGATTG  
AAAGGATATT

15 301 GTTGATAAAT ATAAAGGGAA AAAAGTAGAC TTGTATGGTG CTTATGCTGG  
TTATCAATGT

361 GCGGGTGGTA CACCAAACAA AACAGCTTGT ATGTATGGTG GTGTAACGTT  
ACATGATAAT

20 421 AATCGATTGA CCGAAGAGAA AAAAGTGCCG ATCAATTTAT GGCTAGACGG  
TAAACAAAAT

25 481 ACAGTACCTT TGGAAACGGT TAAAACGAAT AAGAAAAATG TAACTGTTCA  
GGAGTTGGAT

541 CTTCAAGCAA GACGTTATTT ACAGGAAAAA TATAATTTAT ATAACTCTGA  
TGTTTTTGAT

30 601 GGGAAGGTTT AGAGGGGATT AATCGTGTTT CATACTTCTA CAGAACCTTC  
GGTTAATTAC

35 661 GATTTATTTG GTGCTCAAGG ACAGTATTCA AATACACTAT TAAGAATATA  
TAGAGATAAT

721 AAAACGATTA ACTCTGAAAA CATGCATATT GATATATATT TATATACAAG  
TTAAACATGG

40 781 TAGTTTTGAC CAACGTAATG TTCAGATTAT TATGAACCGA GAATAATCTA

SEQ ID NO: 2

45 Staphylococcal enterotoxin A vaccine A489270P, periplasmic:  
Amino acid sequence

1 MKKTAFTLLL FIALTLTTSP LVNGSEKSEE INEKDLRKKS ELQGTALGNL

51 KQIYYNEKA KTENKESHDQ FRQHTILFKG FFTDHSWYND LLVRFDSKDI

50 101 VDKYKGKKVD LYGAYAGYQC AGGTPNKTAC MYGGVTLHDN NRLTEEKVP

151 INLWLDGKQN TVPLETVKTN KKNVTVQELD LQARRYLQEK YNLYNSDVFD  
 201 GKVQRGLIVF HTSTEPSVNY DLFGAQGQES NTLRLIYRDN KTINSENMHI  
 251 DIYLYTS

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**SEQ ID NO: 3**

Staphylococcal enterotoxin A vaccine A489270C, cytoplasmic  
 Gene sequence:

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74 ATGAGAA AAGCGAAGAA ATAAATGAAA AAGATTTGCG  
 AAAAAAGTCT

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121 GAATTGCAGG GAACAGCTTT AGGCAATCTT AAACAAATCT ATTATTACAA  
 TGAAAAAGCT

181 AAAACTGAAA ATAAAGAGAG TCACGATCAA TTTCGACAGC ATACTATATT  
 GTTTAAAGGC

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241 TTTTTCACAG ATCATTCGTG GTATAACGAT TTATTAGTAC GTTTTGATT  
 AAAGGATATT

301 GTTGATAAAT ATAAAGGGAA AAAAGTAGAC TTGTATGGTG CTTATGCTGG  
 TTATCAATGT

25

361 GCGGGTGGTA CACCAAACAA AACAGCTTGT ATGTATGGTG GTGTAACGTT  
 ACATGATAAT

30

421 AATCGATTGA CCGAAGAGAA AAAAGTGCCG ATCAATTTAT GGCTAGACGG  
 TAAACAAAAT

481 ACAGTACCTT TGGAAACGGT TAAAACGAAT AAGAAAAATG TAACTGTTCA  
 GGAGTTGGAT

35

541 CTTCAAGCAA GACGTTATTT ACAGGAAAAA TATAATTTAT ATAACCTCTGA  
 TGTTTTTGAT

601 GGGAAGGTTT AGAGGGGATT AATCGTGTTT CATACTTCTA CAGAACCTTC  
 GGTTAATTAC

40

661 GATTTATTTG GTGCTCAAGG ACAGTATTCA AATACACTAT TAAGAAATATA  
 TAGAGATAAT

45

721 AAAACGATTA ACTCTGAAAA CATGCATATT GATATATATT TATATACAAG  
 TTAAACATGG

781 TAGTTTTGAC CAACGTAATG TTCAGATTAT TATGAACCGA GAATAATCTA

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**SEQ ID NO: 4**

Staphylococcal enterotoxin A vaccine A489270C, cytoplasmic  
 Amino acid sequence

66950-46350

1 MEKSEE INEKDLRKKS ELQGTALGNL KQIYYNEKA KTENKESHDQ  
47 FRQHTILFKG FFTDHSWYND LLVRFDSKDI VDKYKGKKVD LYGAYAGYQC  
5 97 AGGTPNKTAC MYGGVTLHDN NRLTEKKVP INLWLDGKON TVPLETVKTN  
147 KKNVTVQELD LQARRYLQEK YNLYNSDVFD GKVQRGLIVF HTSTEPSVNY  
10 197 DLFGAQQQYS NTLLRIYRDN KTINSENMHI DIYLYTS

**SEQ ID NO: 5**  
Staphylococcal enterotoxin B vaccine B2360210  
Gene sequence:

15 1 GAACTAGGTA GAAAAATAAT TATGAGAAAA CACTATGTTG TTAAAGATGT  
51 TTTCGTATAT AAGTTTAGGT GATGTATAGT TACTTAATTT TAAAAGCATA  
20 101 ACTTAATTAA TATAAATAAC ATGAGATTAT TAAATATAAT TAAGTTTCTT  
151 TTAATGTTTT TTTAATTGAA TATTTAAGAT TATAACATAT ATTTAAAGTG  
25 201 TATCTAGATA CTTTTTGGGA ATGTTGGATA AAGGAGATAA AAAATGTATA  
251 AGAGATTATT TATTTACAT GTAATTTTGA TATTCGCACT GATATTAGTT  
301 ATTTCTACAC CCAACGTTT AGCAGAGAGT CAACCAGATC CTAAACCAGA  
30 351 TGAGTTGCAC AAATCGAGTA AATTCAGTGG TTTGATGGAA GATATGAAAG  
401 TTTTGTATGA TGATAATCAT GTATCAGCAA TAAACGTTAA ATCTATAGAT  
35 451 CAATTTCTAT ACTTTGACTT AATATATTCT ATTAAGGACA CTAAGTTAGG  
501 GGATTATGAT AATGTTTCGAG TCGAATTTAA AAACAAAGAT TTAGCTGATA  
551 AATACAAAGA TAAATACGTA GATGTGTTTG GAGCTAATTA TTATTATCAA  
40 601 TGTTATTTTT CTAAAAAAC GAATGATATT AATTCGCATC AAACGACAA  
651 ACGAAAAACT TGTATGTATG GTGGTGTAAC TGAGCATAAT GGAAACCAAT  
701 TAGATAAATA TAGAAGTATT ACTGTTCTGGG TATTTGAAGA TGGTAAAAAT  
45 751 TTATTATCTT TTGACGTACA AACTAATAAG AAAAAGGTGA CTGCTCAAGA  
801 ATTAGATTAC CTAACGTC ACTATTTGGT GAAAAATAAA AAACCTCTATG  
50 851 AATTTAACAA CTCGCCTTAT GAAACGGGAT ATATTAAATT TATAGAAAAT  
901 GAGAATAGCT TTTGGTATGA CATGATGCCT GCACCAGGAG ATAAATTTGC

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951 CCAATCTAAA TATTTAATGA TGTACAATGA CAATAAAATG GTTGATTCTA  
1001 AAGATGTGAA GATTGAAGTT TATCTTACGA CAAAGAAAAA GTGAAATTAT  
1051 ATTTTAGAAA AGTAAATATG AAGAGTTAGT AATTAAGGCA GGCACCTTATA  
1101 GAGTACCTGC CTTTCTAAT ATTATTTAGT TATAGTTATT TTTGTTATAT  
1151 CTCTCTGATT TAGCATTAAAC CCCTTGTGTC CATTATAGTT TTCACCAACT  
1201 TTAGCTGAAA TTGGGGGATC ATTATTTATCT TTAATATGGA TAGTTACTGT  
1251 GTCGCCGTTT TTAACGATTT GTTCTCTTT TAATTTGTCA GTTAATTTTT  
1301 TCCATGCATC ATTTGCGTCA AACCTATTTT CATTGGATT TATTCTTGAC  
1351 AAATCAATTC TTTTAACACT ATCGGTATTA ATCGGCTTGT TATTAAATTT  
1401 ACTAAGTTCA TCTAAATCAG CTGTACCCGT AATACTACTT TCGCCACCAT  
1451 TATTTAAATT GTACGTAACA CCAACTGTCT CATTGCTGT TTTATCGATA  
1501 ATATTTGCTT CTTTCAAAGC ATCTCTTACA TTTTCCATA AGTCTCTATC  
1551 TGTTATTICA GAAGCCTTTG CAACGTTATT AATACCATTA TAATTTGAAG  
1601 AAGAATGAAA ACCTGAACCT ACTGTTGTTA AAATAAAGC ACTTGCTATC  
1651 AATGTTCTTG TTAATAGTTT TTTATTCATT TTATTTCTC CTATAACTTA  
1701 TTTGCAATCG AT

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**SEQ ID NO: 6**

Staphylococcal enterotoxin B vaccine, B2360210

Amino acid sequence:

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MYKRLFISHVILIFALILVISTPNVLAESQDPKPKDELHKSSKF  
TGLMEDMKVLYDDNHVSAINVKSIDQFLYFDLIYSIKDTKLGDYDNVRVEFKNKDLAD  
KYKDKYVDVFGANYYYQCYFSKKTNDINSHQTDKRKTCMYGGVTEHNGNQLDKYRSIT  
VRVFEDGKNLLSFDVQTNKKKVTAEQELDYLTRHYLVKNKKLYEFNNSPYETGYIKFIE  
NENSFWDMMPPAPGDKFAQSKYLMYNDNKMVDSKDVKIEVYLTTKKK

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**SEQ ID NO: 7**Staphylococcal enterotoxin B vaccine, B899445P, periplasmic  
Gene sequence:

1 GAACTAGGTA GAAAAATAAT TATGAGAAAA CACTATGTTG TTAAAGATGT  
5 51 TTTCGTATAT AAGTTTAGGT GATGTATAGT TACTTAATTT TAAAAGCATA  
101 ACTTAATTAA TATAAATAAC ATGAGATTAT TAAATATAAT TAAGTTTCTT  
151 TTAATGTTTT TTTAATTGAA TATTTAAGAT TATAACATAT ATTTAAAGTG  
10 201 TATCTAGATA CTTTTTGGGA ATGTTGGATA AAGGAGATAA AAAATGTATA  
251 AGAGATTATT TATTTACAT GTAATTTTGA TATTCGCACT GATATTAGTT  
301 ATTTCTACAC CCAACGTTTT AGCAGAGAGT CAACCAGATC CTAAACCAGA  
15 351 TGAGTTGCAC AAATCGAGTA AATTCAGTGG TTTGATGGAA AATATGAAAG  
401 TTTTGTATGA TGATAATCAT GTATCAGCAA TAAACGTAA ATCTATAGAT  
20 451 CAATTCGAT ACTTTGACTT AATATATTCT ATTAAGGACA CTAAGTTAGG  
501 GAATTATGAT AATGTTTCGAG TCGAATTTAA AAACAAAGAT TTAGCTGATA  
551 AATACAAAGA TAAATACGTA GATGTGTTTG GAGCTAATGC TTATTATCAA  
25 601 TGTGCTTTTT CTAAAAAAC GAATGATATT AATTCGCATC AAAC TGACAA  
651 ACGAAAACT TGTATGTATG GTGGTGTAAC TGAGCATAAT GGAAACCAAT  
30 701 TAGATAAATA TAGAAGTATT ACTGTTTCGGG TATTTGAAGA TGGTAAAAAT  
751 TTATTATCTT TTGACGTACA AACTAATAAG AAAAAGGTGA CTGCTCAAGA  
801 ATTAGATTAC CTAACCGTC ACTATTTGGT GAAAAATAAA AAACCTCTATG  
35 851 AATTTAACA CTGCGCTTAT GAAACGGGAT ATATTAAATT TATAGAAAAT  
901 GAGAATAGCT TTTGGTATGA CATGATGCCT GCACCAGGAG ATAAATTTGA  
40 951 CCAATCTAAA TATTTAATGA TGTACAATGA CAATAAAATG GTTGATTCTA  
1001 AAGATGTGAA GATTGAAGTT TATCTTACGA CAAAGAAAA GTGAAATTAT  
1051 ATTTTAGAAA AGTAAATATG AAGAGTTAGT AATTAAGGCA GGCACCTATA  
45 1101 GAGTACCTGC CTTTTCTAAT ATTATTTAGT TATAGTTATT TTTGTTATAT  
1151 CTCTCTGATT TAGCATTAAC CCCTTGTTGC CATTATAGTT TTCACCAACT  
50 1201 TTAGCTGAAA TTGGGGGATC ATTTTATCT TTACTATGGA TAGTTACTGT  
1251 GTCGCCGTTT TTAACGATTT GTTCTCTTT TAATTTGTCA GTTAATTTTT

CCGGTTCGGG

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1301 TCCATGCATC ATTTGCGTCA AACCTATTTT CATTGGATT TATTCTTGAC  
1351 AAATCAATTC TTTTAACACT ATCGGTATTA ATCGGCTTGT TATTAAAATT  
1401 ACTAAGTTCA TCTAAATCAG CTGTACCCGT AATACTACTT TCGCCACCAT  
1451 TATTTAAATT GTACGTAACA CCAACTGTCT CATTGCTGT TTTATCGATA  
1501 ATATTTGCTT CTTTCAAAGC ATCTCTTACA TTTTCCATA AGTCTCTATC  
1551 TGTTATTTCA GAAGCCTTTG CAACGTTATT AATACCATTA TAATTTGAAG  
1601 AAGAATGAAA ACCTGAACCT ACTGTTGTTA AAATAAAGC ACTTGCTATC  
1651 AATGTTCTTG TTAATAGTTT TTTATTCATT TTATTTTCTC CTATAACTTA  
1701 TTTGCAATCG AT

**SEQ ID NO: 8**

Staphylococcal enterotoxin B vaccine, B899445P, periplasmic  
Amino acid sequence:

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MYKRLFISHVILIFALILVISTENVLAESQDPKPDELHKSSKF  
TGLMENMKVLYDDNHVSAINVKSIDQFRYFDLIYSTKDTKLGNYDNVRVEFKNKDLAD  
KYKDKYVDVFGANAYYQCAFSSKKTNDINSHQTDKRKTCMYGGVTEHNGNQLDKYRSIT/  
VRVFEDGKNLLSFDVQTNKKKVTAQELDYLTRHYLVKNKKLYEFNNSPYETGYIKFIE  
NENSFWDMMPPAPGDKFDQSKYLMYNDNKMDSKDVKIEVYLTTKKK

**SEQ ID NO: 9**

Staphylococcal enterotoxin B vaccine, B899445C, cytoplasmic  
Gene sequence:

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325 ATGAGT CAACCAGATC CTAAACCAGA  
351 TGAGTTGCAC AAATCGAGTA AATTCAGTGG TTTGATGGAA AATATGAAAG  
401 TTTTGTATGA TGATAATCAT GTATCAGCAA TAAACGTTAA ATCTATAGAT  
451 CAATTTGAT ACTTTGACTT AATATATTCT ATTAAGGACA CTAAGTTAGG  
501 GAATTATGAT AATGTTTCGAG TCGAATTTAA AAACAAAGAT TTAGCTGATA  
551 AATACAAAGA TAAATACGTA GATGTGTTTG GAGCTAATGC TTATTATCAA  
601 TGTGCTTTTT CTAAAAAAC GAATGATATT AATTCGCATC AAACAGACAA

5  
 651 ACGAAAACT TGTATGTATG GTGGTGTAAC TGAGCATAAT GGAAACCAAT  
 701 TAGATAAATA TAGAAGTATT ACTGTTCCGGG TATTTGAAGA TGGTAAAAAT  
 751 TTATTATCTT TTGACGTACA AACTAATAAG AAAAAGGTGA CTGCTCAAGA  
 801 ATTAGATTAC CTAACGTC ACTATTTGGT GAAAAATAAA AAACCTCTATG  
 10  
 851 AATTTAACAA CTCGCCCTTAT GAAACGGGAT ATATTAAATT TATAGAAAAT  
 901 GAGAATAGCT TTTGGTATGA CATGATGCCT GCACCAGGAG ATAAATTTGA  
 15  
 951 CCAATCTAAA TATTTAATGA TGTACAATGA CAATAAAATG GTTGATTCTA  
 1001 AAGATGTGAA GATTGAAGTT TATCTTACGA CAAAGAAAAA GTGAAATTAT  
 1051 ATTTTAGAAA AGTAAATATG AAGAGTTAGT AATTAAGGCA GGCACCTATA  
 20  
 1101 GAGTACCTGC CTTTCTAAT ATTATTTAGT TATAGTTATT TTTGTTATAT  
 1151 CTCTCTGATT TAGCAATTAAC CCCTTGTTGC CATTATAGTT TTCACCAACT  
 1201 TTAGCTGAAA TTGGGGGATC ATTTTATCT TTAGTATGGA TAGTTACTGT  
 25  
 1251 GTCGCCGTTT TTAACGATTT GTTCTCTTT TAATTTGTCA GTTAATTTTT  
 1301 TCCATGCATC ATTTGCGTCA AACCTATTTT CATTGGATT TATTCTTGAC  
 30  
 1351 AAATCAATTC TTTTAACACT ATCGGTATTA ATCGGCTTGT TATTAAAATT  
 1401 ACTAAGTTCA TCTAAATCAG CTGTACCCGT AATACTACTT TCGCCACCAT  
 35  
 1451 TATTTAAATT GTACGTAACA CCAACTGTCT CATTTGCTGT TTTATCGATA  
 1501 ATATTTGCTT CTTTCAAAGC ATCTCTTACA TTTTCCATA AGTCTCTATC  
 1551 TGTTATTTC AAGCCCTTG CAACGTTATT AATACCATTA TAATTTGAAG  
 40  
 1601 AAGAATGAAA ACCTGAACCT ACTGTTGTTA AACTAAAGC ACTTGCTATC  
 1651 AATGTTCTTG TTAATAGTTT TTTATTCATT TTATTTCTC CTATAACTTA  
 45  
 1701 TTTGCAATCG AT

**SEQ ID NO:10**

Staphylococcal enterotoxin B vaccine, B899445C, cytoplasmic  
Amino acid sequence:

50 MSQPDPKPDELHKSSKFTGLMENMKVLYDDNHVSAINVKSIDQFRYFDLIYSIKDTKL  
 GNYDNVRVEFKKDLADKYKDKVVDVFGANAYYQCAFSKKTNDINSHQTDKRKTCMYG



120  
 GVTEHNGNQLDKYRSITVRVFEDGKNLLSFDVQTNKKKVTAQELDYLTRHYLVKNKKL  
 YEFNNSPYETGYIKFIENENSWYDMMPAPGDKFDQSKYLMYNDNKMVDSKDVKIEV  
 200  
 YLTTKKK

**SEQ ID NO: 11**

Staphylococcal toxic shock syndrome toxin-1 vaccine TST30  
 Gene sequence:

1 TAAGGAGAAT TAAAAATGAA TAAAAAATTA CTAATGAATT TTTTATCGT  
 51 AAGCCCTTTG TTGCTTGCGA CAACTGCTAC AGATTTTACC CCTGTTCCCT  
 101 TATCATCTAA TCAAATAATC AAAACTGCAA AAGCATCTAC AAACGATAAT  
 151 ATAAAGGATT TGCTAGACTG GTATAGTAGT GGGTCTGACA CTTTACAAA  
 201 TAGTGAAGTT TTAGATAATT CAGAGGATC TATGCGTATA AAAACACAG  
 251 ATGGCAGCAT CAGCTTGATA ATTTTCCGA GTCCTTATTA TAGCCCTGCT  
 301 TTTACAAAAG GGGAAAAAGT TGA CTTAAAC ACAAAAAGAA CTAAAAAAG  
 351 CCAACATACT AGCGAAGGAA CTTATATCCA TTTCAAATA AGTGGCGTTA  
 401 CAAATACTGA AAAATTACCT ACTCCAATAG AACTACCTTT AAAAGTTAAG  
 451 GTTCATGGTA AAGATAGCCC CTAAAGTAT GGGCCAAAGT TCGATAAAAA  
 501 ACAATTAGCT ATATCAACTT TAGACTTTGA AATTCGTCAT CAGCTAACTC  
 551 AAATACATGG ATTATATCGT TCAAGCGATA AAACGGGTGG TTATTGGAAA  
 601 ATAACAATGA ATGACGGATC CACATATCAA AGTGATTTAT CTAAAAAGTT  
 651 TGAATACAAT ACTGAAAAAC CACCTATAAA TATTGATGAA ATAAAAACTA  
 701 TAGAAGCAGA AATTAATTAA TTTACCACTT T

**SEQ ID NO: 12**

Staphylococcal toxic shock syndrome toxin-1 vaccine TST30  
 Amino acid sequence:

MKKLLMNFFIVSPLLLATTATDFTPVPLSSNQIIKTAKASTND  
 NIKDLLDWYSSGSDFTNSEVLNDSRSGSMRIKNTDGSISLIIFPSPYYSPAFTKGEKV  
 DLNTRTKKSQHTSEGTYIHFIQISGVTNTEKLPPIELPLKVHVHGKDSPLKYGPKFD

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1051 TTTATACACT CAATCTAAAC TATAATAATT GGAATCATCT TCAAA

**SEQ ID NO: 14**

Staphylococcus enterotoxin C1 vaccine SEC45

Amino acid sequence:

MNKSRLFISCVILIFALILVLFTPNVLAESQPDPTDELHKASKF

TGLMENMKVLYDDHYVSATKVKSVDKFRAHDLIYNISDKKLKNYDKVKTELLNEGLAK

KYKDEVVDVYGSNYYVNCYFSSKDNVGKVTGGKTCMYGGITKHEGNHFDNGNLQNVLI

RVYENKRNTISFEVQTDKKSMTAQELDIKARNELINKKNLYEFNSSPYETGYIKFIEN

NGNTFWYDMMPPAGDKFDQSKYLMYNDNKTVDKSVKIEVHLTTKNG"

**SEQ ID NO: 15**

Streptococcal pyrogenic exotoxin A vaccine SPEA42

Gene sequence:

1 TCATGTTTGA CAGCTTATCA TCGATAAGCT TACTTTTCGA ATCAGGTCTA

51 TCCTTGAAAC AGGTGCAACA TAGATTAGGG CATGGAGATT TACCAGACAA

101 CTATGAACGT ATATACTCAC ATCACGCAAT CGGCAATTGA TGACATTGGA

151 ACTAAATTCA ATCAATTTGT TACTAACAAG CAACTAGATT GACAACTAAT

201 TCTCAACAAA CGTTAATTTA ACAACATTCA AGTAACTCCC ACCAGCTCCA

251 TCAATGCTTA CCGTAAGTAA TCATAACTTA CTAAAACCTT GTTACATCAA

301 GGTTTTTTCT TTTTGTCTTG TTCATGAGTT ACCATAACTT TCTATATTAT

351 TGACAACTAA ATTGACAACT CTTCAATTAT TTTTCTGTCT ACTCAAAGTT

401 TTCTTCATTT GATATAGTCT AATTCCACCA TCACTTCTTC CACTCTCTCT

451 ACCGTCACAA CTTTCATCATC TCTCACTTTT TCGTGTGGTA ACACATAATC

501 AAATATCTTT CCGTTTTTAC GCACTATCGC TACTGTGTCA CCTAAAATAT

551 ACCCCTTATC AATCGCTTCT TTAAACTCAT CTATATATAA CATATTTTAT

601 CCTCCTACCT ATCTATTCGT AAAAAGATAA AAATAACTAT TGTTTTTTTT

651 GTTATTTTAT AATAAAATTA TTAATATAAG TTAATGTTTT TTAATAATAT

701 ACAATTTTAT TCTATTTATA GTTAGCTATT TTTTCATTGT TAGTAATATT

751 GGTGAATTGT AATAACCTTT TTAAATCTAG AGGAGAACCC AGATATAAAA

669341 1463600

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 801 TGGAGGAATA TTAATGGAAA ACAATAAAAA AGTATTGAAG AAAATGGTAT  
 851 TTTTTGTTTT AGTGACATTT CTTGGACTAA CAATCTCGCA AGAGGTATTT  
 901 GCTCAACAAG ACCCCGATCC AAGCCAACTT CACAGATCTA GTTTAGTTAA  
 951 AAACCTTCAA AATATATATT TTCTTTATGA GGGTGACCCT GTTACTCACG  
 10  
 1001 AGAATGTGAA ATCTGTTGAT CAACTTAGAT CTCACGATTT AATATATAAT  
 1051 GTTTCAGGGC CAAATTATGA TAAATTAAAA ACTGAACTTA AGAACCAAGA  
 1101 GATGGCAACT TTATTTAAGG ATAAAAACGT TGATATTTAT GGTGTAGAAT  
 15  
 1151 ATTACCATCT CTGTTATTTA TGTGAAAATG CAGAAAGGAG TGCATGTATC  
 1201 TACGGAGGGG TAACAAATCA TGAAGGGAAT CATTTAGAAA TTCCTAAAAA  
 20  
 1251 GATAGTCGTT AAAGTATCAA TCGATGGTAT CCAAAGCCTA TCATTTGATA  
 1301 TTGAAACAAA TAAAAAATG GTAAC'TGCTC AAGAATTAGA CTATAAAGTT  
 1351 AGAAAAATATC TTACAGATAA TAAGCAACTA TATACTAATG GACCTTCTAA  
 25  
 1401 ATATGAAACT GGATATATAA AGTTCATACC TAAGAATAAA GAAAGTTTTT  
 1451 GGT'TTGATTT TTCCCTGAA CCAGAATTTA CTCAATCTAA ATATCTTATG  
 30  
 1501 ATATATAAAG ATAATGAAAC GCTTGACTCA AACACAAGCC AAATTGAAGT  
 1551 CTACCTAACA ACCAAGTAAC TTTT'TGCTTT TGGCAACCTT ACCTACTGCT  
 35  
 1601 GGATTTAGAA ATTTTATTGC AATTC'TTTA TTAATGTAAA AACCGCTCAT  
 1651 TTGATGAGCG GTTTTGTCTT ATCTAAAGGA GCTTTACCTC CTAATGCTGC  
 1701 AAAATTTTAA ATGTTGGATT TTTGTATTTG TCTATTGTAT TTGATGGGTA  
 40  
 1751 ATCCCATTTT TCGACAGACA TCGTCGTGCC ACCTCTAACA CCAAATCAT  
 1801 AGACAGGAGC TTGTAGCTTA GCAACTATTT TATCGTC

**SEQ ID NO:16**

Streptococcal pyrogenic exotoxin A vaccine SPEA42  
 Amino acid sequence:

MENNKKVLKKMVFFVLVTFGLTISQEVFAQQDPDPSQLHRSSL

50  
 VKNLQNIYFLYEGDPVTHENVKSVDQLRSHDLIYNVSGPNYDKLKT'ELKNQEMATL'FK  
 DKNVDIYGV'VEYYHLCYLCENAERSACIYGGVTNHEGNHLEIPKKIVKVSIDGIQSL'S

FDIETNKKMVT AQELDYKVRKYLT DNKQLYTNGPSKYETGYIKFIPKNKESFWFDFFP

EPEFTQSKYLMYKDNETLDSNTSQIEVYLTK

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SECRET